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TM 8-618

WAR DEPARTMENT TECHNICAL MANUAL

U.S. Dept. of Army

SUCTION



APPARATUS

PORTABLE, ELECTRIC

WAR DEPARTMENT • MAY 1945

WAR DEPARTMENT TECHNICAL MANUAL

TM 8-618

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SUCTION APPARATUS,
PORTABLE, ELECTRIC



WAR DEPARTMENT

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TM 8-618, Suction Apparatus, Portable, Electric, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

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Refer to FM 21-6 for explanation of distribution formula.

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PART ONE

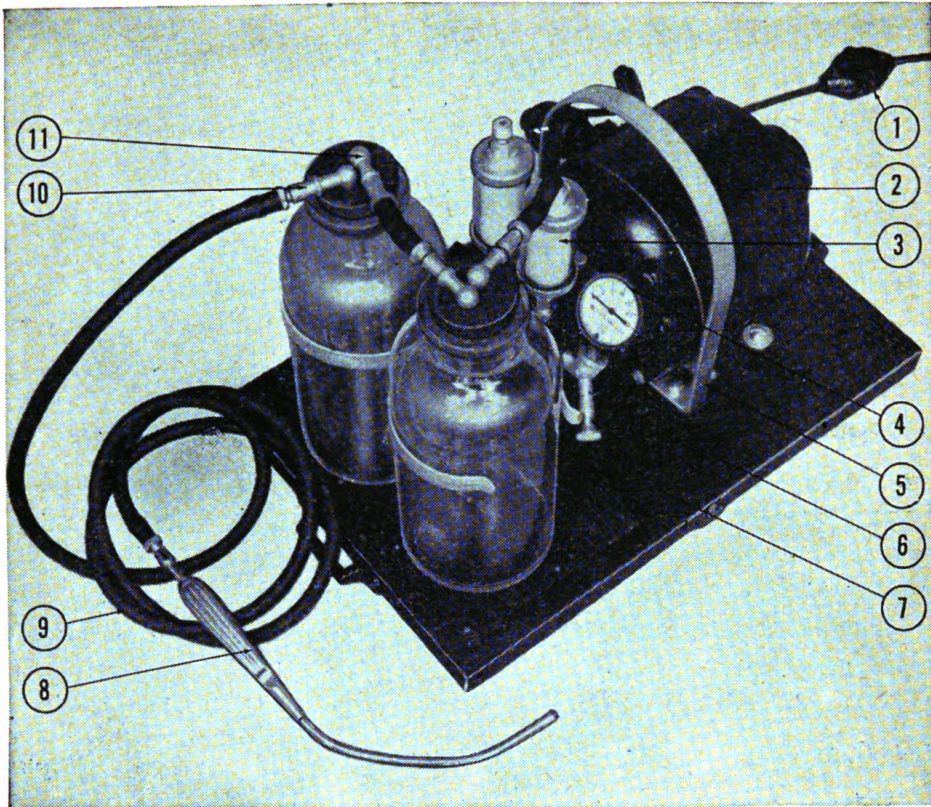
INTRODUCTION

Section I. GENERAL

I. Scope

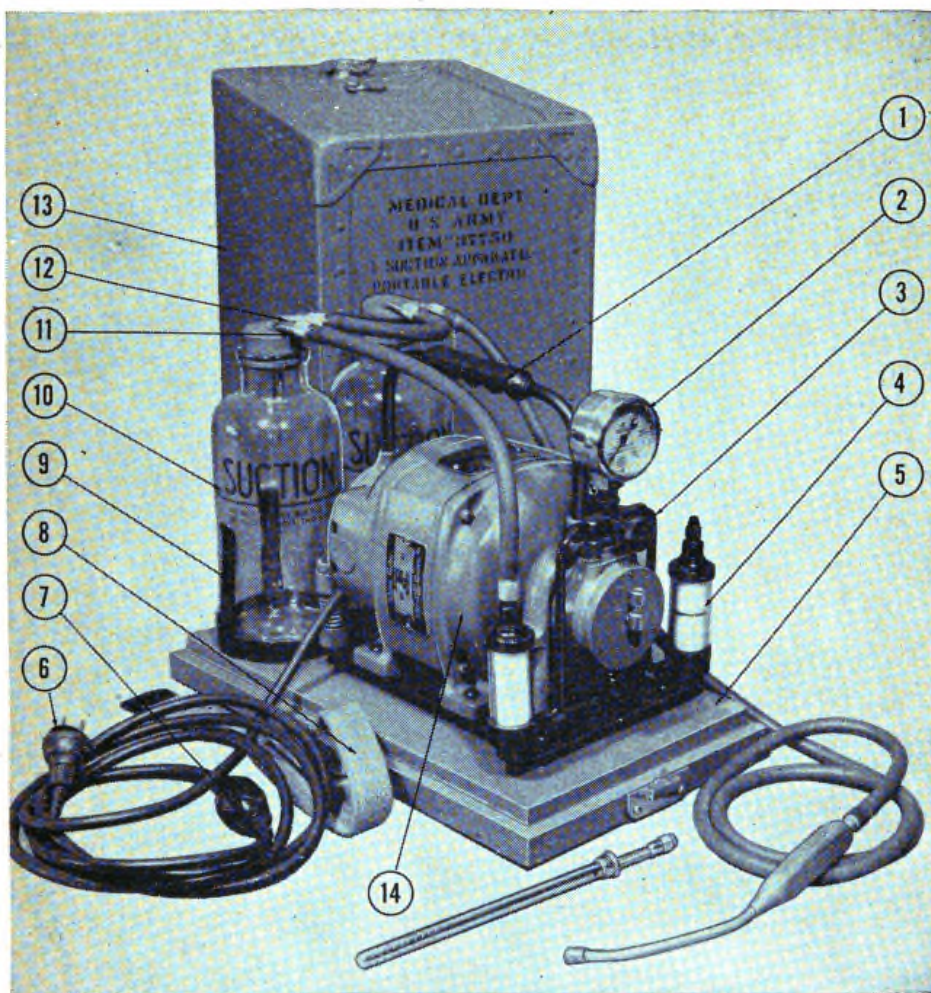
a. These instructions are published for the information and guidance of the personnel to whom this equipment is assigned. They contain information on the operation and maintenance of the equipment as well as descriptions of the major units and their functions in relation to the other components of the equipment. They apply only to the following Medical Department items:

<i>Med. Dept. Item</i>	<i>Nomenclature</i>	<i>Figure</i>
3775006	Suction apparatus, portable, 110 volt, 25 cycle.	
3775007	Suction apparatus, portable, 110 volt, 50 cycle.	
3775008	Suction apparatus, portable, 110 volt, 60 cycle.	1, 2
3775010	Suction apparatus, portable, 110 volt, D.C.	
3775014	Suction apparatus, portable, 220 volt, 50 cycle.	3



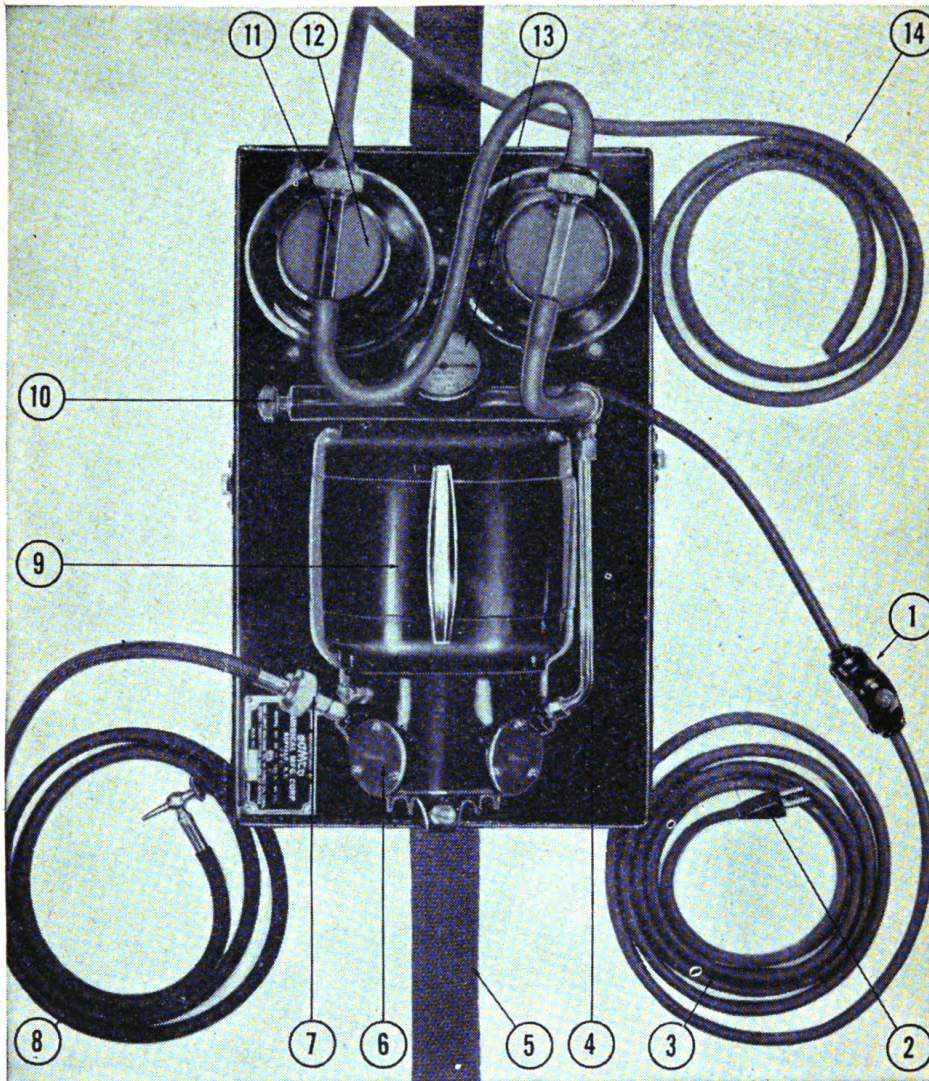
- | | | | |
|----|---------------------------------------|-----|---|
| 1. | Single Pole Switch. | 7. | Filter Base. |
| 2. | Motor, 110 V., 60 Cycle,
Complete. | 8. | Yankauer Tube. |
| 3. | 3R01004 Chamber, Filter, Glass: | 9. | SR00058 Tubing, Rubber, $\frac{3}{8}$ Inch,
O.D. $\frac{3}{16}$ Inch I.D.: |
| 4. | Vacuum Gauge. | 10. | Female Fitting. |
| 5. | Motor Handle. | 11. | Male Fitting. |
| 6. | Regulating Valve Elbow
Fitting. | | |

Figure 1. Suction apparatus, Sorenson, assembled and ready for use.



- | | | | |
|----|---------------------------------|-----|--|
| 1. | Motor Handle. | 9. | Bottle Holder. |
| 2. | Vacuum Gauge. | 10. | SR00060 Bottle, Wide Mouth, Flint, Round 32 Oz.: |
| 3. | Filter Coupling. | 11. | Short Angle Tube. |
| 4. | 3R01206 Chamber, Filter, Glass: | 12. | Long Angle Tube. |
| 5. | Wood Base. | 13. | Carrying Case. |
| 6. | Male Plug. | 14. | Motor, 110 V., 60 Cycle, Complete. |
| 7. | Single Pole Switch. | | |
| 8. | Web Strap. | | |

Figure 2. Suction apparatus, Sklar, assembled with accessories, ready for use.



- | | | | |
|----|-----------------------|-----|---|
| 1. | Single Pole Switch. | 9. | Motor Handle. |
| 2. | Male Plug. | 10. | Complete Control Bar. |
| 3. | Neoprene Cord. | 11. | Inlet and Outlet Fitting. |
| 4. | Metal Air Line. | 12. | SR00059 Stopper, Rubber, 2 Hole, |
| 5. | Web Strap. | | No. 9: |
| 6. | Filter Cover. | 13. | Vacuum Gauge. |
| 7. | Female Fitting. | 14. | SR00058 Tubing, Rubber, $\frac{3}{8}$ Inch, |
| 8. | Silk Pressure Tubing. | | O.D. $\frac{3}{16}$ Inch I.D.: |

Figure 3. Suction apparatus, Gomco, cover removed, ready for use.

b. These instructions are arranged in three parts: Part One, Introduction; Part Two, Operating Instructions; Part Three, Maintenance Instructions.

c. All requisitions for spare parts should be submitted in accordance with the latest revision of ASF Supply Catalog Med-7.

2. Records

No special maintenance forms are required to be kept by the using personnel except as may be prescribed by the Medical Officer in charge.

Section II. DESCRIPTION AND DATA

3. Description

The electric portable suction apparatus is used to suck blood from body cavities and to remove blood and other fluids during surgery. The apparatus may also be used for spraying fluids.

4. Data

- a.* Item No. 3775006 operates on 110 volts, 25 cycles A.C.
- b.* Item No. 3775007 operates on 110 volts, 50 cycles A.C.
- c.* Item No. 3775008 operates on 110 volts, 60 cycles A.C.
- d.* Item No. 3775010 operates on 110 volts, D.C.
- e.* Item No. 3775014 operates on 220 volts, 50 cycles A.C.
- f.* Vacuum bottles have a capacity of 32 ounces each. The bottles are connected in series, so that the overflow from the first suction bottle will automatically flow into the second bottle.
- g.* Compressor sets up a minimum vacuum of 20 inches.
- h.* Compressor sets up a minimum positive pressure of 20 pounds per square inch.

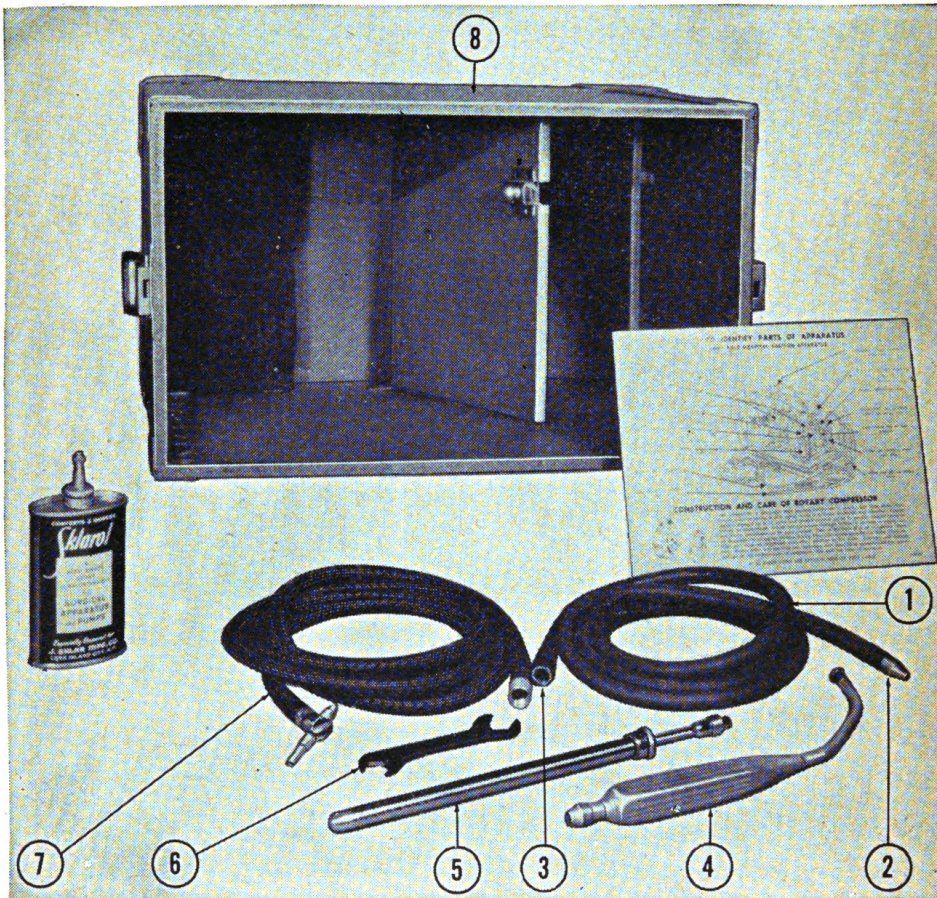
5. Manufacturers

- a.* C. M. Sorenson Company, New York, N. Y., Model No. "Field Unit."
- b.* J. Sklar Manufacturing Company, Long Island City, N. Y., Model No. "U. S. Army Field Hospital."
- c.* Gomco Surgical Manufacturing Corp., Buffalo, N. Y., Model No. 98.

Section III. TOOLS AND ACCESSORIES

6. Tools and Accessories

a. Silk pressure tubing (fig. 4(7)). (For use, see par. 14.)



- | | | | |
|------------|--|----|------------------------------------|
| 1. SR00058 | Tubing, Rubber, $\frac{3}{8}$ Inch
O.D. $\frac{3}{16}$ Inch I.D.: | 5. | Poole's Abdominal Suction
Tube. |
| 2. | Male Coupling. | 6. | Wrench. |
| 3. | Female Coupling. | 7. | Silk Pressure Tubing. |
| 4. | Yankauer Tube. | 8. | Carrying Case. |

Figure 4. Carrying case cover with all accessories for Sklar model.

b. Medical Department Item No. 3547700 Tube, abdominal, suction: Poole, 23 Fr., $8\frac{3}{4}$ inch (fig. 4(5)). (For use, see par. 13b.)

c. Tube, Yankauer (3R01260) (fig. 4(4)). (For use, see par. 13c.)

d. Wrench, suction apparatus: For disassembling filters (TR00044).

PART TWO

OPERATING INSTRUCTIONS

Section IV. GENERAL

7. Scope

Part Two contains information for the guidance of the personnel responsible for the operation of the equipment. It contains information on the operation of the equipment with a description and location of the controls and instruments.

Note. Failure or unsatisfactory performance of equipment will be reported on WD AGO Form 468.

Section V. SERVICE UPON RECEIPT OF EQUIPMENT

8. Unpacking

a. To unpack the suction apparatus, portable, electric, proceed as follows:

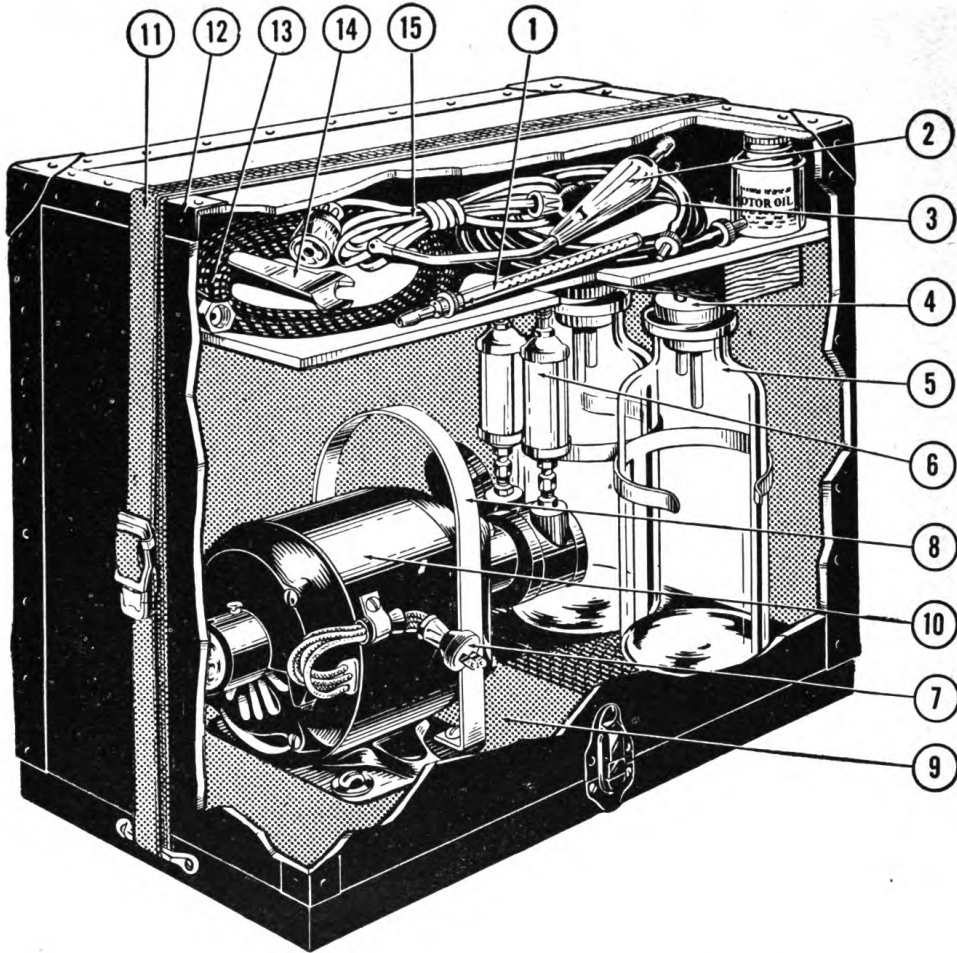
- (1) Open the shipping box carefully.
- (2) Remove paper packing in order to uncover the case.
- (3) Lift case from the shipping box.

b. The suction apparatus, portable, electric, is issued in its carrying container assembled and ready for operation, except for plugging in the line cord, connecting the suction rubber tubing, silk pressure tubing and attachments.

c. Unpack case as follows:

(1) Open case by unlatching the hasps and loosening the web strap. Lift off the case cover.

(2) Remove the rubber suction tubing, silk pressure tubing, and accessories necessary for operation, from the compartment inside the case cover. (See fig. 5.)



- | | | | |
|----|---|-----|------------------------------------|
| 1. | Poole's Abdominal Suction Tube. | 7. | Male Plug. |
| 2. | Yankauer Tube. | 8. | Motor Handle. |
| 3. | SR00058 Tubing, Rubber, $\frac{3}{8}$ Inch O.D. $\frac{3}{16}$ Inch I.D.: | 9. | Wood Base. |
| 4. | SR00059 Stopper, Rubber, 2 Hole, No. 9: | 10. | Motor, 110 V., 60 Cycle, Complete. |
| 5. | SR00060 Bottle, Wide Mouth, Flint, Round, 32 Oz.: | 11. | Web Strap. |
| 6. | 3R01004 Chamber, Filter, Glass: | 12. | Carrying Case. |
| | | 13. | Silk Pressure Tubing. |
| | | 14. | Wrench. |
| | | 15. | Neoprene Cord. |

Figure 5. Sorenson model with cut away of cover.

9. Assembling

To set up the suction apparatus, portable, electric for operation, proceed as follows:

a. GOMCO MODEL. (1) Attach the silk pressure tubing to the positive pressure outlet of the pump by means of the knurled nut (fig. 3(7)) if the apparatus is to be used for spraying.

(2) Attach the rubber tubing to the vacuum bottle by means of the knurled nut if the apparatus is used for suction.

(3) The Yankauer suction tube or the Poole's abdominal suction tube, Medical Dept. Item No. 3547700 may be slipped into the end of the vacuum rubber tubing as the operation may require.

(4) Plug the line cord into the electric outlet. Be certain that the current is the same as specified on the nameplate.

(5) The apparatus is then ready for use.

b. SORENSON MODEL. (1) Attach the silk pressure tubing to the positive pressure outlet of the pump if the apparatus is to be used for spraying.

(2) Connect the short rubber tubing on the suction purifier to the male fitting on the suction bottle if the apparatus is to be used for suction.

Caution: This unit must be assembled so that suction from the pump goes through the short-angle tube to the vacuum bottle, and through the long-angle tube to the patient.

(3) The Yankauer suction tube or the Poole's abdominal suction tube may be slipped into the end of the vacuum rubber tubing as the operation may require.

(4) Plug the line cord into the electric outlet. Be certain that the current is the same as specified on the nameplate.

(5) The apparatus is then ready for use.

c. SKLAR MODEL. (1) Attach the silk pressure tubing to the positive pressure outlet of the pump if the apparatus is to be used for spraying.

(2) Connect the rubber tubing to the short-angle tube if the apparatus is to be used for suction.

Caution: This unit must be assembled so that suction from the pump goes through the short-angle tube to the vacuum bottle, and through the long-angle tube to the patient.

(3) The Yankauer suction tube or the Poole's abdominal suction tube may be slipped into the end of the vacuum rubber tubing as the operation may require.

(4) Plug the line cord into the electric outlet. Be certain that the current is the same as specified on the base nameplate.

(5) The apparatus is then ready for use.

Section VI. CONTROLS AND INSTRUMENTS

10. Controls

a. LINE SWITCH. Each model has a single pole "ON" and "OFF" switch attached to the line cord.

b. REGULATING VALVE. A regulating valve is located on the suction side of the pump and is used to regulate the amount of vacuum to the vacuum bottles.

c. THUMB CUT-OFF. A cut-off valve is located at the end of the silk pressure tubing and is a means of regulating the pressure for spraying.

11. Instruments (Vacuum Gauge)

A vacuum gauge is located on the vacuum side of the pump and indicates negative pressure only.

Section VII. OPERATION

12. General

The operation of the suction apparatus, portable, electric is left to the discretion of the medical officer in charge; however, the following procedure is suggested.

a. PRESTARTING INSTRUCTIONS. (1) Check all hose attachments and make sure they are tight, then make certain that rubber stoppers are firmly inserted in both vacuum bottles and that the bottles are connected in series.

(2) Before operating the apparatus for the first time in any building, make sure that the electric current is the same as that specified on the nameplate.

(3) Turn the regulating valve control knob completely in.

(4) Lubricate the compressor. (See par. 16.)

b. STARTING INSTRUCTIONS. To start the suction apparatus proceed as follows:

(1) Insert the male plug on the line cord into the power source outlet.

(2) Turn the line cord switch to the "ON" position.

c. DURING OPERATION INSTRUCTIONS. (1) It is not necessary to change the position of the regulating valve control knob except in certain cases, such as sinus drainage, where high suction is dangerous.

(2) The vacuum gauge will not indicate until a negative pressure is created. This vacuum is accomplished by closing the rubber vacuum tubing leading to the vacuum bottle. When this tubing is fully closed and

the regulating valve turned in all the way, the vacuum gauge should register 20 inches.

(3) The vacuum bottles should not be filled above the caution fill line or fluid will enter the compressor.

13. Using Negative Pressure (Vacuum)

a. Negative pressure is used for sucking blood from body cavities and for removing blood and other fluids during an operation. Two 32-ounce vacuum bottles connected by rubber tubing in series are used. These bottles may be used together or individually, each independent of the other. To operate the bottles individually, interchange the rubber tubing connecting them.

b. Use the Poole abdominal suction tube as follows: slip it into the end of the rubber suction tubing. This tube is used for aspirating and remains stationary during use.

c. Use the Yankauer suction tube as follows: slip it into the end of the rubber suction tubing. Hold the tube in the hand while removing blood or other fluids during surgery.

14. Using Positive Pressure (Spraying)

Use the silk pressure tubing for spraying fluids by attaching the inlet thumb cut-off to a standard spray bottle. Regulate the pressure by placing the thumb or finger over the opening in the thumb cut-off.

PART THREE

MAINTENANCE INSTRUCTIONS

Section VIII. GENERAL

15. Scope

Part Three contains information for first and second echelon maintenance. It contains information needed for service, as well as description of major units and their function in relation to other components of the equipment.

Section IX. LUBRICATION

16. After 5 Hours of Operation

Fill the oil reservoir of the compressor with Oil, lubricating, preservative, medium, PM, after every 5 hours of operation.

17. After 96 Hours of Operation

Place six drops of Oil, lubricating, preservative, medium, PM, in oil cup of the motor.

Section X. PREVENTIVE MAINTENANCE SERVICES

18. Operator Maintenance (first echelon)

- a. BEFORE OPERATION.* (1) Clean motor if necessary. (See par. 24*g*.)
(2) Lubricate compressor if necessary. (See par. 16.)
- b. DURING OPERATION.* (1) Observe level of liquid in vacuum bottles. Empty if necessary.
(2) Clean the compressor if any fluid gets into it during operation. (See pars. 22 and 23.)
- c. AFTER OPERATION.* (1) Clean base and bottle supports. (See par. 24*a* and *h*.)
(2) Clean the inside and outside of the case. (See par. 24*b*.)
(3) Clean the silk pressure tubing. (See par. 24*c*.)

(4) Clean the rubber tubing which runs from the vacuum bottle to the patient. (See 24*d*.)

(5) Disassemble and clean the Yankauer suction tube and Poole suction tube. (See par. 24*e* and *f*.)

(6) The motor must be kept clean and turned off when not in use. (See par. 24*g*.)

19. Organizational Maintenance (second echelon)

a. MONTHLY. (1) Check to see that filters are clean. Replace whenever oil or discoloration appears.

(2) Check for proper operation of the unit.

(3) Check to see if compressor is clean. Clean if necessary. (See pars. 22 and 23.)

Section XI. TROUBLE SHOOTING

20. Motor Fails to Operate

Possible causes

- a.* Line cable improperly plugged into supply line.
- b.* Defective line plug.
- c.* No voltage at source of supply.
- d.* Damaged or broken wires.
- e.* Motor coils burned out.
- f.* Improper current supply.

Possible remedies

- a.* Plug line cable in properly.
- b.* Check plug. Replace if necessary.
- c.* Check source of supply.
- d.* Repair or refer to higher echelon.
- e.* Refer to higher echelon.
- f.* Check nameplate for proper current supply.

21. Lack of Pressure During Operation

Possible causes

- a.* Air leaks at connections.
- b.* Fluid in compressor unit.
- c.* Bronze compressor slides not in proper order.
- d.* Defective hoses.

Possible remedies

- a.* Tighten all hose connections and rubber bottle stoppers.
- b.* Clean. (See pars. 22 and 23.)
- c.* Replace properly in slots of the compressor assembly. (See pars. 22 and 23.)
- d.* Replace hoses.

Section XII. MAINTENANCE OPERATIONS

22. Cleaning Gomco Compressor

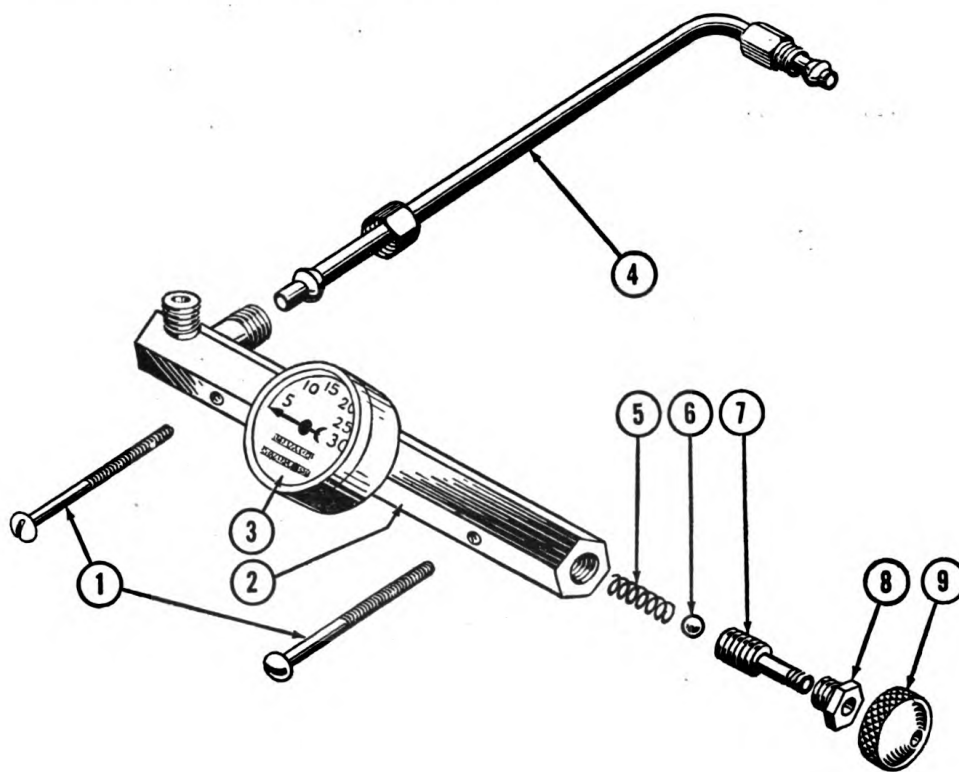
a. WITHOUT DISMANTLING AFTER A SMALL QUANTITY OF FLUID HAS OVERFLOWED INTO THE COMPRESSOR AND THE COMPRESSOR HAS NOT CEASED TO OPERATE. (1) Remove the two filter covers.

(2) Allow a teaspoonful of Solvent, dry cleaning to be sucked into the suction side.

(3) After all dirty oil and solvent has been expelled, permit a small amount of OIL, lubricating, preservative, medium, PM, to be sucked into the suction side.

(4) The old felt filters must be replaced with new ones.

b BY DISMANTLING. (1) Thoroughly clean the control bar and air line. (See fig. 6 and par. 25.)



1. Control Bar Mounting Screws.
2. Control Bar.
3. Vacuum Gauge.
4. Metal Air Line.
5. Valve Spring.

6. Valve Ball Check.
7. Valve Screw.
8. Valve Check Nut.
9. Valve Control Knob.

Figure 6. Exploded view of control bar and vacuum gauge assembly, Gomco model.

(2) Remove the faceplate screws and then take off the compressor faceplate. (See fig. 7(11).)

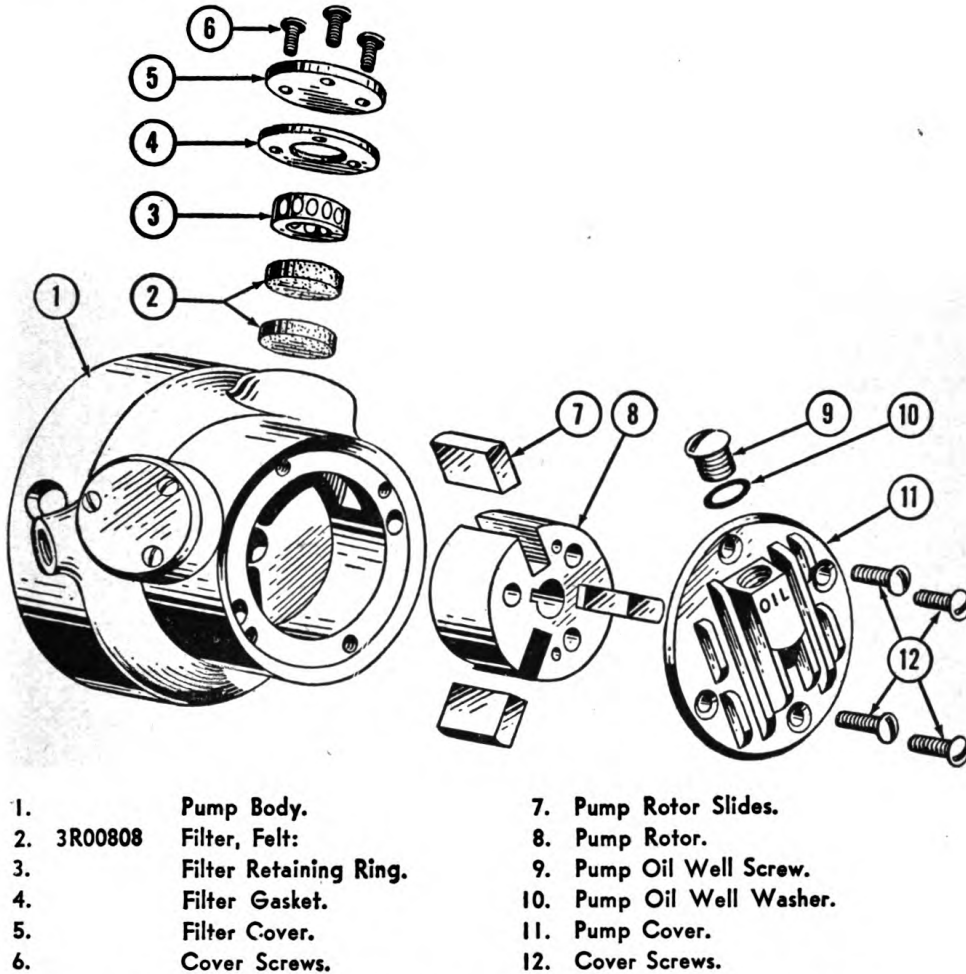


Figure 7. Exploded view of compressor assembly, Gomco model.

(3) Withdraw the rotor (fig. 7 (8)), by inserting two of the faceplate screws into the two threaded holes in the rotor and then screwing them in for about two or three turns. This will provide a means of pulling out the rotor.

(4) Pull out evenly and gently on the two screws. Observe the position of the slides (fig. 7 (7)) and the rotor.

Caution: The slides must be inserted carefully into exactly the same slots from which they were taken. They will not fit closely enough for operation in any but their original slots. The rotor must be replaced in the same position as it was before removal. Do not scratch or nick the surfaces of the compressor parts or poor operation will result.

(5) Clean all parts thoroughly with ether or Solvent, dry cleaning.

- (6) Dry completely with a soft cloth.
- (7) Wipe the rotor with OIL, lubricating, preservative, medium, PM, before placing back on shaft.
- (8) Reassemble. (See CAUTION, par. 22b(4).)

23. Cleaning Sorenson and Sklar Compressors

a. WITHOUT DISMANTLING AFTER A SMALL QUANTITY OF FLUID HAS OVERFLOWED INTO THE COMPRESSOR AND THE COMPRESSOR HAS NOT CEASED TO OPERATE. (1) Remove the two purifiers.

(2) Allow a teaspoonful of oil to be sucked into the suction fitting and expelled from the pressure fitting.

(3) Take the purifiers apart, clean them thoroughly with soap and water and dry.

(4) Replace the old gauze with fresh gauze (consists of approximately 30 inches of 2-inch gauze bandage made into a roll). Do not roll gauze tightly.

(5) Replace the rubber washers and make sure the purifiers are tight.

b. BY DISMANTLING. (1) Remove the five faceplate screws and the faceplate of the compressor.

(2) Remove the rotor and the slides, observing their position.

Caution: The slides must be inserted carefully into exactly the same slots from which they were taken. They will not fit closely enough for operation in any but their original slots. The rotor must be replaced in the same position as it was before removal. Do not scratch or nick the surfaces of the compressor parts or poor operation will result.

(3) Clean the entire housing inside and out, and all other parts with ether or Solvent, dry cleaning.

(4) Dry thoroughly.

(5) Replace all parts. There are no gaskets to be replaced. (See CAUTION, par. 23b(2).)

(6) Put the faceplate back and tighten the screws evenly into the plate. Do not tighten one screw tighter than the others or leaks will occur.

(7) Clean all rubber tubing and the bottle top long-angle and short-angle tubes.

(8) Dry thoroughly and replace the tubing.

24. Cleaning and Sterilizing Component Parts

a. BASE AND BOTTLE SUPPORTS. The base and bottle supports must be kept clean: blood or mucous must be removed after any use of the equipment. Wash thoroughly whenever necessary with soap and warm water.

b. CASE. The case must be kept clean inside and outside. Wash whenever necessary with soap and water.

c. SILK PRESSURE TUBING. The silk pressure tubing should be flushed after use with clear warm soapy water.

d. RUBBER TUBING. The rubber tubing which runs from the vacuum bottle to the place of use must be cleaned thoroughly after use. To clean, remove tubing from fittings and clean thoroughly in warm (not hot) water; dry completely. (See TM 8-611.)

e. YANKAUER SUCTION TUBE. The Yankauer suction tube must be taken apart and cleaned thoroughly after using. To do this, unscrew the tip and clean with green soap and hot water; then sterilize. (See TM 8-611.)

f. POOLE ABDOMINAL SUCTION TUBE. The Poole abdominal suction tube must be taken apart and cleaned thoroughly after using. Unscrew shield and clean with green soap and hot water; then sterilize. (See TM 8-611.)

g. MOTOR. Clean the motor cover with a clean soft rag.

h. VACUUM BOTTLES. The vacuum bottles should not be allowed to fill past the caution fill line or fluid will enter the compressor. They may be cleaned with Acetone, Medical Department Item No. 1003000 or soap and water, then dried.

25. Cleaning of Control Bar and Air Line, Gomco Model

If fluid has overflowed into the compressor, the control bar and the air line of the Gomco Model must also be cleaned. Clean as follows:

a. Remove the rubber tube and clean it with warm water and dry thoroughly.

b. Unscrew the compression nut holding the air line to the control bar.

c. Remove the control bar from the motor by removing the two screws.

d. Remove the air line from the pump by unscrewing the compression nut at the pump. Clean with water and dry thoroughly.

e. Remove the regulating valve parts (fig. 6), clean with water and dry thoroughly.

f. Reassemble, being certain to reassemble the regulating valve in the order shown in figure 6 (5), (6), (7), (8), and (9).

26. Replacing Felt Filters, Gomco Model

Whenever fluid overflows into the compressor or when the filters become oil soaked, they must be replaced. To replace filters:

a. Remove the three screws and the filter cover. (See fig. 7 (5).)

b. Remove the gasket, filter ring and felt washers.

c. Replace with new filters and reassemble.

27. Repacking Filters of Sorenson and Sklar Models

- a. Remove the hose by unscrewing the hose coupling.
- b. Unscrew the top cap on the filters and remove the filter chamber glass.
- c. Remove the soiled filter.
- d. Replace the soiled filter on the suction side by winding about 30 inches of 2-inch gauze bandage loosely around the metal stem of the filter.
- e. Replace the soiled filter on the pressure side of the Sorenson model as described in paragraph 27d. The Sklar model has a ventilating disk which separates the upper and lower sections of the filter. To repack, wind about 30 inches of 1-inch gauze bandage loosely around the bottom of the filter stem, then replace the ventilating disk and wind about 30 inches of 1-inch gauze at top end of filter stem.
- f. Replace rubber washers and filter cap.

APPENDIX

DISASSEMBLING AND PACKING

Disassemble and pack all three models of the suction apparatus as follows :

1. Remove the line plug from the electric outlet.
2. Remove all accessories and place them in the accessories compartment in the cover of the case.
3. Put the cover in place, fasten the hasps, and buckle the strap tightly around the case. The suction apparatus is then completely packed.
4. It may be crated if necessary, using a strong wooden box and packing materials to keep the apparatus from shifting during shipment.

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